FB-3100

Polyphonic Synthesizer

Version 1.1

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Table of Contents

Introduction

The *FB-3100* is a software synthesizer plug-in for Microsoft Windows (VST) and Apple macOS (VST/AU) simulating the classic KORG PS-3100 polyphonic analog synthesizer from 1977. It is written in native C++ code for high performance even on "lighter" systems. The main features are:

- Close emulation of behavior and all controls of the original hardware
- Band-limited oscillators, classic two-pole lowpass filters
- Resonators section
- Two Modulation Generators, Sample & Hold
- Additional paraphonic Envelope Generator
- Semi-modular patch panel
- Micro-tuning option
- Additional tweaks
- Plug-in supports Windows and macOS (32 bit and 64 bit)

History

In 1977, KORG released two new synthesizer, the *PS-3100* and the *PS-3300*, where "PS" is short for *Polyphonic Synthesizer*. By that time not many polyphonic synthesizers were around, and being even *fully* polyphonic the PS brothers (in close approximation the PS-3300 consists of three PS-3100) were propelled into the noble company of a Polymoog.

A PS-3100 features no less than 48 voices with 48 filters and 48 envelopes but only 12 oscillators generating the top octave frequencies for the twelve keys C to B; the remaining 36 signals are derived by frequency division. And here it comes again, the stigma of frequency divider circuitry: The PS-3100 (like the Polymoog) is just an *organ* – it uses the same cursed technology! And so it surely sounds like a cheesy organ, too!? I respectfully disagree, although it *can* sound cheesy. ☺

When looking at the PS-3100's front panel, the first thing that catches the eye is the large patch bay to the right – this synthesizer is somehow modular. The affinity to the MS-20 is obvious... but wait: The MS-20 came one year later (in 1978). The PS-3100 was in fact the first synthesizer with the classic KORG patch bay, previewing many of the well-known MS-20 features, and the first (semi-)modular polyphonic synth at all!

Also on year later came the PS-3200, KORG's first *programmable* polyphonic synthesizer… but that's another story.

Digital Transformation

In 2017 and only forty years after its release, I took a closer look at the PS-3100 and to my surprise found many features that are pretty unique to this amazing machine. Having just finished versions 2.0 of the *Mono/Fury* and *the blooo* I started my next project: The *FB-3100*.

Aim of the project was to provide a close simulation of the original hardware and not some highly evolved, hyper-extended, next generation *SuperPS-3100++ deluxe*. As usual, this included some decisions that maybe some folks do not like:

- The FB-3100 is not stereophonic (although you can pan the *Final* and *Direct* outputs in the stereo field) and does not react to Velocity.
- The monophonic/paraphonic modulation options of the PS-3100 remain monophonic/paraphonic in the FB-3100.
- There is still only one oscillator per voice.
- The UI is too small. This is *always* true. ☺
- The patch bay of the FB-3100 does not use virtual patch cords but "patch menus".

I am pretty sure that especially the last bullet will cause a storm of protest. But here is my point: Since the panel is already pretty crowded (and of course too small, see above) I strongly believe that lingering "patch cords" will not help to visualize the current patch connections either. Another advantage is that *patch junctions* (ports that provide multiple "copies" of the original source) are no longer needed. Overall the patch bay of the FB-3100 looks much cleaner this way.

On the other hand I added some tweaks not to be found on the PS-3100:

- The funny *Hold* mode behavior can be overridden with the somehow more intuitive "expected standard behavior" of a Hold function.
- The three-step *EM Release* switch can be overridden by a continuous Release control knob.
- Modulation Generators and Sample & Hold can be synchronized to the host.
- MIDI controllers can be used as sources for virtual voltages and triggers.
- The patch bay features a few more modulation sources than the PS-3100.
- An external signal can be fed into the monophonic signal path of the FB-3100 (starting with the *Resonators* section).

Again I am pretty sure that especially the last bullet is a very interesting feature because you can use the FB-3100 as an VST/AU effect!

Acknowledgments

No, I am not affiliated with KORG in what relation ever except that I always find myself entangled with their instruments. ☺

Architecture

Each of the 64 voices of the FB-3100 features a band-limited *Signal Generator* (*SG*), a 2-pole *Lowpass* filter (*LP*), and an *Envelope Modulator* (*EM*). The mix of all voices is then sent into a single (!) *Resonators* section consisting of three bandpass filters/resonators, followed by an *Amplitude Modulation* section and two *Voltage Controlled Amplifiers* (*VCAs*). For modulation purposes the FB-3100 has two *Modulation Generators* (*MG 1+2*), a *Sample & Hold* unit, an additional *General Envelope Generator* (*GEG*), and two *Voltage Processors* (*VP 1+2*).
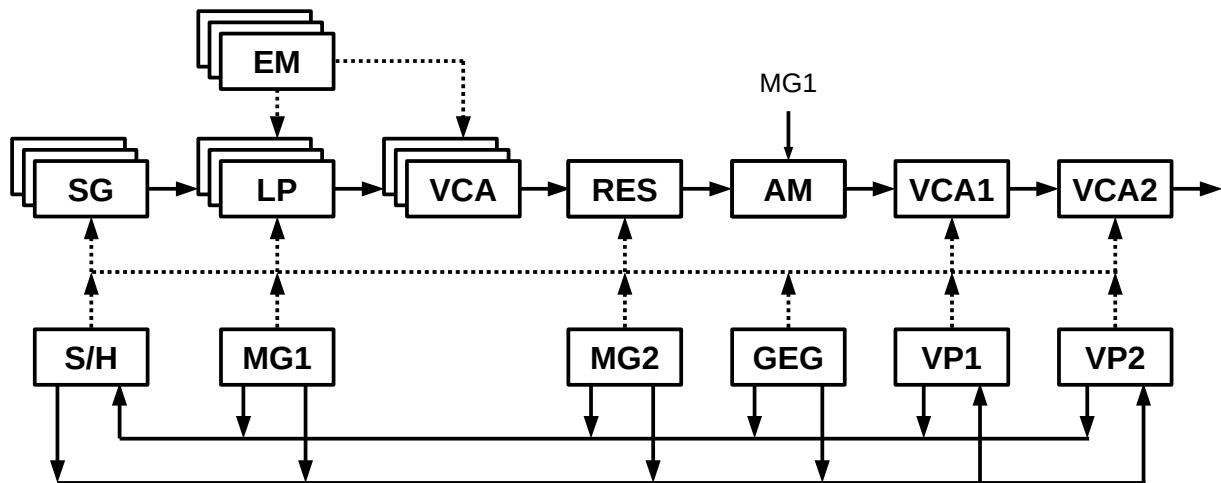
As you can see from the block diagram, there are many signal (solid) and modulation (dashed) paths between the various modules. The configuration is pretty flexible and can be reconfigured in the *Patch Bay*.

You can see, too, that further processing of the polyphonic signals after the LP section is *monophonic* (better: *paraphonic*). For example the modulation of VCA1 does affect the volume of *all* voices and not that of an *individual* voice. In the same sense the GEG acts as a paraphonic envelope and not *per voice*.

Polyphonic Section

Signal Generators (SG)

The Signal Generators offer six selectable waveforms (*Triangle*, *Sawtooth*, *Square*, *Rectangle*, *Pulse*, and *Pulse Width Modulation*), four octave ranges (16' to 2'), fine and coarse tuning and frequency modulation controls. Note that per key (C to B) only one *top-octave* oscillator exists – the lower octaves are generated by frequency division. Thus, the signals of the same key at different octaves are always *in phase*; you can verify this by analyzing the output of the FB-3100 with an oscilloscope.

Frequency modulation (FM) can be enabled by the orange switch at the right of the SG section; the other orange switch ("REV.") to the left flips the polarity of the modulation. While the first source for FM is always given be the *MG* signal (see section *The "MG" Signal*), the second modulation source is set to the GEG. However, this setting can be overridden by selecting a different source (see section *Patch Bay*). The same is true for Pulse Width modulation which by default is performed by MG2 but can be set to any other source, too.

An interesting feature is the *micro-tuning* option. Each of the 12 keys can be tuned individually, allowing for other (not necessarily well-tempered) tunings like *Pythagorean* or *Wendy Carlos' Super Just* tuning etc. The small button at the bottom of the tuning knobs opens a menu with 14 predefined micro-tuning templates. Here it is also possible to load and/or save the tuning settings from/to a Scala (`*.scl`) file.

Lowpass Filters (LP)

The output of the Signal Generators is fed into a two-pole lowpass filter section with adjustable resonance (*Peak*). Yes, this is an emulation of the famous KORG K-35 filter but as in the PS-3100 it cannot be pushed to self-oscillation. Sorry.

Cutoff frequency modulation comes in various ways: First of all the cutoff can be controlled by the note played (*KBD Balance*) both in positive and negative direction (here *negative* means that the cutoff frequency will be *lower* for *higher* notes).

The next knob, *Expand*, controls the influence of the Envelope Modifier (see next section) on the cutoff frequency while the remaining options for frequency modulation resemble those of the Signal Generators: Activated by the orange switch, the filter can be modulated by the (fixed) MG signal and a second source (by default the GEG). Again, the latter setting can be changed via the Patch Bay.

Envelope Modifiers (EM)

The envelopes are of the standard *ADSR* type except that the release time cannot be controlled continuously but only in three steps: *Damp* (very short), *Half Damp* (pretty short) and *Release* (pretty long). FB-3100 owners will love the option to override the Release time by a variable amount (see section *Tweaks*).

Another funny feature is the *Hold* function: When switched on the envelope does not go into the Release phase once a key is unpressed; instead you have to press the same key *again* to release it.

Working with the Hold function can be tricky because it will only get activated if the Attack time setting is higher than 70% (i.e. the Attack knob is turned almost fully to the right). Furthermore, deactivating the Hold function requires the Attack time setting to be less than 30% (i.e. the Attack knob is turned almost fully to the left). If you are confused now: Go to the *Tweaks* section and learn how to override this weird behavior*.*

Monophonic/Paraphonic Section

Resonators

As stated above the individual voice signals are mixed into a single monophonic signal (the *Direct* signal) and sent into the *Resonators* section. This is basically a parallel arrangement of three bandpass filters with high Q (i.e. resonators) and individually adjustable center frequencies. The "INTENSITY" control determines the mix between original and effect signal.

The resonator frequencies can be modulated by MG2 via the "MG2 MOD" switch and/or by an additional source that has to be selected via the Patch Bay. In the latter case the intensity of the modulation can be adjusted continuously using the "EXT MOD" knob.

The Resonators section has become pretty famous and is one of the key features giving the PS-3100/3300 brothers their "signature sound". Unfortunately, it was replaced in the PS-3200 by a static (!) 7-stage equalizer.

Amplitude Modulation

Following the Resonators, the signal runs through an *Amplitude Modulator* which multiplies it with the signal of MG1 (can be disabled by using the orange switch to the bottom of the Amplitude Modulation section). Here, the "AMP MOD" knob sets the intensity and character of the effect as follows:
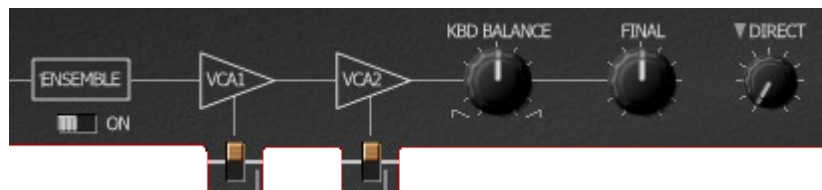
- The range from 0% to 50% (i.e. from the very left to the center of the knob range) will result in a *Cross Modulation* effect. This means that the amplitude of the signal is modulated from -∞ dB to a maximum of 0dB.

- The range from 50% to 100% (i.e. from the center to the very right of the knob range) will result in a *Ring Modulation* effect meaning that negative values of the MG1 signal will (apart from attenuation) cause the modulated signal to be *inverted*. This makes perfect sense if you think of Ring modulation as a *multiplication*.

The interesting thing is that MG1 is able to generate signals in the kilohertz range which allows for drastic sound effects. But even in the low range a Ring Modulation with a sawtooth wave can result in unusual gate effects.

The Remaining Signal Path

After Amplitude Modulation the signal passes through a (switchable) *Ensemble* effect as known from classic string synthesizers of the 70's. Compared to the PS-3100, the FB-3100 Ensemble effect does produce much less noise!

Next to follow are two individual *VCAs* (Voltage Controlled Amplifiers) for further amplitude modulation. The purpose of these amplifiers is the dynamic control of the loudness contour by the General Envelope Generator and Voltage Processor 1 (both VCAs have respective switches to enable these modulation sources) but nothing prevents you from patching your own sources via the Patch Bay.

Another unique feature is the *Keyboard Balance* that adjusts the volume of notes as played on the keyboard. With this control you can attenuate notes on the lower end or vice versa.

Finally, the *Final* knob controls the output volume of the full signal path while the *Direct* knob controls the volume of an additional outlet of the polyphonic signal i.e. a mix of all voices after the lowpass filters but before the Resonators section. This is because the original PS-3100 offers two mono outputs, namely the *Final* and the *Direct* signals. On the FB-3100 you can pan both signals individually (see *Tweaks* section) which gives a bit more flexibility.

Modulation Generators

MG1 and MG2

The FB-3100 has two *Modulation Generators* (LFOs). The second one, *MG2*, only offers a triangle wave while the first one, *MG1*, is much more flexible and can produce a triangle, a falling or rising sawtooth, and a square wave as well as (pretty uncommon!) *Pink Noise* and *White Noise*. Except for the noise waves (which have a continuous frequency range) the frequency of MG1 can be set up to about 1.6kHz – again a very uncommon but nice feature!

Both MGs can be synchronized to the host tempo. Furthermore, by patching an appropriate source one can *modulate* the frequency of MG1.

Sample & Hold

Next on the list is the *Sample & Hold* (*S/H*) unit. By default, the S/H samples the output of MG1 at a fixed clock rate which can be synchronized to the host tempo. Again the input can be overridden via the Patch Bay.

The "SYNC" switch (called "SYNCHRO" on the PS-3100) is bit curious. KORG's original documentation states that "*when the sampled frequency is near the clock frequency multiplied by an integer, the clock is synchronized*". Well, better check it out by yourself. Fact is that a regular/periodic input signal can produce some regular, repetitive output while noise will create random patterns. In any case the SYNC function is disabled when the S/H clock is synchronized to the host tempo.

The "MG" Signal

Studying the PS-3100 schematics shows that the label "MG1" on the original PS-3100 panel (for example as a modulation source for SG and LP) is a bit misleading. Taking a sneak preview of the Patch Bay one finds that the hard-wired modulation path (marked red in the image to the right) can be the *attenuated* output of MG1 **or** the S&H unit – depending on the state of the white switch. So I decided to name this source signal "MG" instead of "MG1".

Furthermore, in contrary to the FB-3100 the PS-3100 does not offer an individual outlet of the MG1 signal; the outlet labeled "MG1" on the original PS-3100 panel is in fact equivalent to the "MG" signal on the FB-3100.
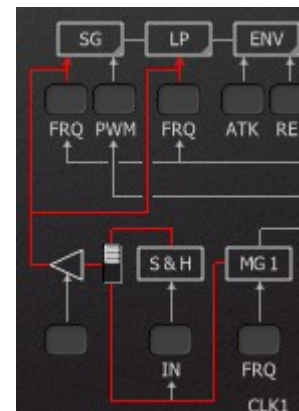
General Envelope Generator (GEG)

The GEG is a simple *AR* envelope with an additional *Delay* parameter; by default it will modulate VCA1 (provided the respective orange switch is set). It can be turned into an *AD*-like envelope by enabling the "AUTO" switch: In this case the GEG – once triggered – will ignore the Sustain phase and go immediately into the Release phase.

Since there is only one GEG for all voices, the KORG engineers found a nice solution for triggering the envelope. First of all the GEG can be triggered by any trigger signal patched in the Patch Bay. But even more interesting is the "TRIGGER" switch: Here you can select how many keys (1 to 5) have to be pressed before the GEG is triggered (in the "Off" position the keyboard by default does not trigger the GEG at all).

The polarity switch changes the output polarity of the GEG. Note that in the upper ("positive") position the output will range from -5 to 0 (virtual) Volts while in the lower ("negative") position from 0 to +5 Volts. This may seem a bit odd but that's what it is on the original PS-3100 too.

What's not on the PS-3100 is the status LED that shows the current on/off state of the GEG – I think this is a very convenient yet non-obstructive addition.

Voltage Processors

There are two *Voltage Processors*, VP1 and VP2, on board the FB-3100. They are used to process the signal of a modulation source (e.g. MG1 or GEG) and to produce a modified signal. Here is how that works:

Typically, a signal source can vary from something like -5 to +5 (virtual) Volts. A Voltage Processor will change the range these input values will be mapped to, for example from -2.5 to +1.8 Volts. The input range even can inverted, for example from +3.4 to -4.2 Volts. The limits of the output ranges are set by the "LIMITER A" and "LIMITER B" knobs where "LIMITER B" defines the low end of the range (in the examples above -2.5 and +3.4 Volts) and "LIMITER A" the high end (in the examples above +1.8 and -4.2 Volts).

Patch Bay

The *Patch Bay* is where the magic happens. Here you can add or replace/override the assignment of modulation sources to targets.

The following rule applies: If you select a source (e.g. "S/H") for a modulation target (e.g. "LP FRQ") then the default assignment will be overridden (in this example this would be "S/H" overriding the default GEG assignment for LP cutoff frequency modulation).
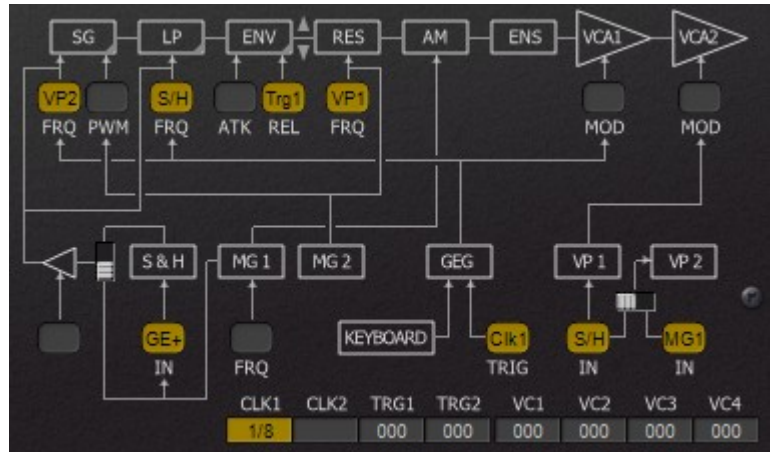
Strictly speaking there are two types of sources and targets: *modulations* and *triggers*. For example the "ATK" target of the EM continuously modulates the Attack time while the "REL" target waits for a trigger signal to release the envelopes.
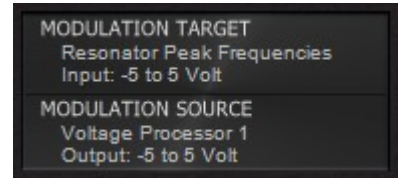
When hovering with the mouse over a modulation/trigger target, the properties of both the target and the assigned source (if any) will be displayed in the info block at the bottom right of the FB-3100's panel.

There are some additional modulation ("VC1" to "VC4") and trigger sources ("Clk1", "Clk2", "Trg1", "Trg2") available. The "Clk" sources provide variable clock triggers synchronized to the host tempo, the "Trg" sources create trigger signals from assignable MIDI Control Change messages (the trigger occurs when the controller value passes from a value above 63 to a value below 63, emulating a "falling-edge ground trigger"), and the "VC" modulation sources create modulation signals from assignable MIDI Control Change messages. In the Patch Bay you can choose these sources like any other source.

Tweaks

In the section *Digital Transformation* above it has already been mentioned that the FB-3100 contains some additional features (*tweaks*) that the original PS-3100 hardware synthesizer does not have.

- Additional modulation sources "MG1", "Key", "PB", "PB+", "VC1" to "VC4"

- Additional S/H input sources "Rnd", "Key", "PB", "PB+", "VC1" to "VC4"

- Additional trigger sources "Clk1", "Clk2", "Trg1", "Trg2"

- Panorama control for *Final* and *Direct* output

- Override for PS-3100 EM Hold mode and Release time
- External input (inserted right before the Resonators section)

Not really a tweak (since the PS-3100 does feature a momentary switch) but nonetheless helpful is the "MANUAL TRG1" push button that – when clicked – raises a trigger impulse for the "Trg1" trigger source.

Options Menu

When clicking on the *Menu* button, a context menu opens with the following options:

Copy Program	Copy current program to internal clipboard
Paste Program	Paste internal clipboard to current program
Load Program	Load a program file containing a patch to the FB-3100's current program
Save Program	Save the FB-3100's current program to a program file
Load Bank	Load a bank file containing 64 FB-3100 patches
Save Bank	Save the FB-3100's 64 patches to a bank file
Init Program	Initialize the current program
Reload Configuration	Reload the FB-3100's configuration file (see section *The fb3100.ini Configuration File*)
Save Configuration	Save the FB-3100's configuration file (see section *The fb3100.ini Configuration File*)
Select Startup Bank	Select the Startup bank file that should always be loaded when the FB-3100 is started
Load Startup Bank	Load the Startup bank file; can also be used to check what the current Startup bank is
Unselect Startup Bank	Unselect the current Startup bank
Check Online for Update	When connected to the Internet, this function will check if a newer version of the FB-3100 is available at fullbucket.de
Visit fullbucket.de	Open fullbucket.de in your standard browser

The *fb3100.ini* Configuration File

The FB-3100 is able to read some settings from a configuration file (`fb3100.ini`) located in the same directory as the FB-3100 VST DLL (`fb3100.dll` or `fb310064.dll`) or Mac VST/AU (`FB3100.component` or `FB3100.vst`) itself. After you have edited this INI file in a text editor, you have to reload it using the *Reload Configuration* command from the *File* menu (see section *The fb3100.ini Configuration File*).

MIDI Control Change Messages

All parameters of the FB-3100 can be controlled by MIDI controllers, or more precise: Each MIDI controller (except *Modulation Wheel* and *Sustain Pedal*) can control one of FB-3100's parameters. The mapping is defined in the `fb3100.ini` for example like this:

```
[MIDI Control]
CC7  = 0  # Final Volume
CC70 = 17 # LP Cutoff
CC71 = 18 # LP Peak
...
```

The syntax is straight forward:

```
CC<controller number> = <parameter ID>
```

Given the above example, controller 7 directly controls the overall *Volume* parameter, controller 74 the *VCF Cutoff* etc. As you can see, comments are introduced by the Pound sign (#); they are here just for description purposes and completely optional.

MIDI Learn

The easiest way to assign MIDI controllers to FB-3100 parameters is to use the MIDI Learn function. To activate *MIDI Learn*, click on the respective button and wiggle both the MIDI controller and the FB-3100's parameter that you want to link. If you want to unlearn the assignment, right-click the *MIDI Learn* button (the label now reads "UNLEARN") and activate it. Now wiggle the MIDI controller or the parameter that you want to unlearn.

Modulation and Trigger Sources

Modulation Sources		
Name	Voltage	Description
off	0	off / default
GEG	-5 to 0 or 0 to 5	GEG normal output
GE+	0 to 5	GEG positive output
MG	-5 to 5	MG signal
MG1	-5 to 5	MG1 output
MG2	-5 to 5	MG2 output
S/H	-5 to 5	S/H output
VP1	-5 to 5	VP1 output
VP2	-5 to 5	VP2 output
Key	-5 to 5	last pressed key
PB	-5 to 5	Pitch Bend
PB+	0 to 5	Pitch Bend positive
MW	-5 to 5	Mod Wheel
MW+	0 to 5	Mod Wheel positive
VC1	-5 to 5	assignable MIDI CC
VC2	-5 to 5	assignable MIDI CC
VC3	-5 to 5	assignable MIDI CC
VC4	-5 to 5	assignable MIDI CC

S/H Input	
Name	Description
off	default (= MG1)
GEG	GEG normal output
GE+	GEG positive output
MG	MG signal
MG1	MG1 output
MG2	MG2 output
Rnd	Random (White Noise)
VP1	VP1 output
VP2	VP2 output
Key	last pressed key
PB	Pitch Bend
PB+	Pitch Bend positive
MW	Mod Wheel
MW+	Mod Wheel positive
VC1	assignable MIDI CC
VC2	assignable MIDI CC
VC3	assignable MIDI CC
VC4	assignable MIDI CC

Trigger Sources	
Name	Description
off	off
Sng	Keyboard Single Trigger
Mlt	Keyboard Multiple Trigger
MG1	MG1 clock
MG2	MG2 clock

Trigger Sources (cont'd)	
Name	Description
S/H	S/H clock
Clk1	external clock
Clk2	external clock
Trg1	MIDI CC trigger
Trg2	MIDI CC trigger

Parameters

Global

parameter	ID	description
Final Volume	0	the overall volume of the *Final* signal
Direct Volume	1	the volume of the *Direct* (polyphonic section) signal
Final Panorama	2	the stereo position of the *Final* signal
Direct Panorama	3	the stereo position of the *Direct* signal
Keyboard Balance	4	volume balance of low versus high notes
Pitch Bend Range	5	range of the Pitch Bend modulation

Signal Generators

parameter	ID	description
SG Waveform	6	waveform (*Triangle, Sawtooth, Square, Rectangle, Pulse, Pulse Width Modulation*)
SG PWM Intensity	7	intensity of the Pulse Width Modulation
SG Fine Tune	8	frequency fine tuning
SG Coarse Tune	9	frequency coarse tuning
SG Octave	10	Octave (*16′, 8′, 4′, 2′*)
SG Frequency Mod Enable	11	activates the Frequency Modulation
SG Frequency Mod Reverse	12	polarity of the Frequency Modulation
SG Frequency Mod by MG1	13	Frequency Modulation amount of MG1
SG Frequency Mod by GEG/Ext	14	Frequency Modulation amount of GEG or external/patched source
SG Frequency Mod Source	15	external/patched modulation source for Frequency Modulation
SG Pulse Width Mod Source	16	external/patched modulation source for Pulse Width Modulation

Lowpass Filter

parameter	ID	description
LP Cutoff Frequency	17	cutoff frequency
LP Peak	18	peak (resonance)
LP Balance	19	keyboard balance (tracking)
LP Expand	20	intensity of modulation by Envelope Modifier
LP Frequency Mod Enable	21	activates the Cutoff Frequency Modulation
LP Frequency Mod by MG1	22	Cutoff Frequency Modulation amount of MG1
LP Frequency Mod by GEG/Ext	23	Cutoff Frequency Modulation amount of GEG or external/patched source
LP Frequency Mod Source	24	external/patched modulation source for Cutoff Frequency Modulation

Envelope Modifier

parameter	ID	description
EM Attack	25	Attack time
EM Decay	26	Decay time
EM Sustain	27	Sustain level
EM Release	28	Release time (*Damp*, *Half Damp*, *Release*)
EM Hold	29	activates the Hold function
EM Attack Time Mod Source	30	external/patched modulation source for Attack time
EM Release Trigger Source	31	external/patched trigger source for Release phase

Resonators

parameter	ID	description
Resonators Intensity	32	mix between original and Resonators effect signal
Resonator 1 Frequency	33	peak frequency of first resonator
Resonator 2 Frequency	34	peak frequency of second resonator
Resonator 3 Frequency	35	peak frequency of third resonator
Resonators Frequency Mod by MG2	36	activates the Peak Frequency Modulation by MG2
Resonators Frequency Ext Mod Intensity	37	amount of Peak Frequency Modulation by external/patched modulation source
Resonator Peak Frequencies Mod Source	38	external/patched modulation source for Peak Frequency Modulation

Total Signal Modifiers

parameter	ID	description
Amplitude Mod Intensity	39	intensity of the Amplitude Modulation
Amplitude Mod by MG1	40	activates the Amplitude Modulation
Ensemble	41	activates the Ensemble effect
VCA1 Mod by GEG	42	activates the modulation of VCA1 by GEG
VCA1 Amplitude Mod Source	43	external/patched modulation source for VCA1
VCA2 Mod by VP1	44	activates the modulation of VCA2 by VP1
VCA2 Amplitude Mod Source	45	external/patched modulation source for VCA2

Modulation Generators 1/2 and Sample & Hold

parameter	ID	description
MG1 Waveform	46	Waveform (*Triangle*, *Falling Sawtooth*, *Rising Sawtooth*, *Square*, *Pink Noise*, *White Noise*)
MG1 Frequency	47	frequency
MG1 Frequency Mod Source	48	external/patched source for frequency modulation
MG Signal Selector	49	MG Signal selector (*S/H* or *MG1*)
MG Signal Mod Source	50	external/patched source for MG Signal modulation
MG1 Sync to Host	51	sync to host tempo rate
MG2 Frequency	52	47
MG2 Sync to Host	53	sync to host tempo rate
S/H Clock Frequency	54	sample clock rate
S/H Synchro	55	Activates the Synchro function
S/H Input Source	56	sample input source
S/H Sync to Host	57	sync to host tempo rate

General Envelope Generator

parameter	ID	description
GEG Trigger	58	number of keys to be pressed for triggering the GEG
GEG Delay	59	Delay time
GEG Attack	60	Attack time
GEG Release	61	Release time
GEG Auto	62	activates the Auto function
GEG Polarity	63	sets the output polarity
GEG Trigger Source	64	external/patched trigger source

Voltage Processors 1 and 2

parameter	ID	description
VP1 Limiter A	65	Limiter A of VP1
VP1 Limiter B	66	Limiter B of VP1
VP1 Input Source	67	input source of VP1
VP2 Limiter A	68	Limiter A of VP2
VP2 Limiter B	69	Limiter B of VP2
VP2 Source Select	70	sets the input source of VP2 (*VP1* or *VP2*)
VP2 Input Source	71	input source of VP2

Temperament (Micro-Tuning)

parameter	ID	description
Tune C to *B*	72 – 83	individual tuning for keys C to B

External Modulation and Trigger Sources

parameter	ID	description
Clock1 Source	84	sync to host rate for Clk1
Clock2 Source	85	sync to host rate for Clk2
Trigger1 Source	86	MIDI CC assignment for Trg1
Trigger2 Source	87	MIDI CC assignment for Trg2
VC1 Source	88	MIDI CC assignment for VC1
VC2 Source	89	MIDI CC assignment for VC2
VC3 Source	90	MIDI CC assignment for VC3
VC4 Source	91	MIDI CC assignment for VC4

Tweaks

parameter	ID	description
Use PS3100 Hold Function Mode	92	activates the PS-3100 Hold function mode behaviour
Override EM Release switch	93	activates the EM Release time override
EM Override Release Time	94	override for EM Release time
Resonator Input Mix	95	mix between internal and external input signal

Frequently Asked Questions

Before you read on here, please make sure that you also have read my statements regarding the FB-3100's capabilities and limitations at the beginning of this manual (see section *Digital Transformation*).

How do I install the FB-3100 (Windows 32 bit version)?

Just copy the files `fb3100.dll` and `fb3100.ini` from the ZIP archive you have downloaded to your system's or favorite DAW's VST plug-in folder. Your DAW should automatically register the FB-3100 VST plug-in the next time you start it.

How do I install the FB-3100 (Windows 64 bit version)?

Just copy the file `fb310064.dll` and `fb3100.ini` from the ZIP archive you have downloaded to your system's or favorite DAW's VST plug-in folder. Your DAW should automatically register the FB-3100 VST plug-in the next time you start it.

Note: You may have to remove any existing (32 bit) `fb3100.dll` from your VST plug-in folder or else your DAW may screw the versions up...

How do I install the FB-3100 (Mac VST/AU universal 32/64 bit)?

Locate the downloaded PKG package file `fb3100_1_1_6_mac.pkg` in Finder (!) and do a right- or control-click on it. In the context menu, click on "Open". You will be asked if you really want to install the package because it comes from an "unidentified developer" (me ☺). Click "OK" and follow the installation instructions.

What is the plug-in ID of the FB-3100?

The ID is FB31.

Will you support the FB-3100?

Yes. If you have problems, found a bug, or have some suggestions about the FB-3100 please send me a mail: `full.bucket@gmx.net` .

Does the PS-3100 have a status LED for the GEG?

Nope, I added that to the FB-3100 for convenience.

How do I know if a new version of the FB-3100 is available?

When connected to the Internet, open the Options menu (see section *Options Menu*) by clicking the disk icon and select the entry "Check Online for Updates". If a new version of the FB-3100 is available on fullbucket.de the respective information will be shown in a message box.